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Patent

Serial No. 10/502,526

Amendment in Reply to Office Action of April 3, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-17. (Canceled)

18. (Previously presented) Data storage apparatus, comprising

means for writing information on a data storage medium having a user area and a spare area defined thereon,

means for allocating into the spare area, data assigned to portion user area having a medium defect, upon detection of the defect on the medium,

means for providing information about the size of a contiguous free region in the user area, and

means for at least partially re-allocating the data allocated in the spare area into the contiguous free region in the user area if the size of the contiguous free region exceeds or is equal to a determined threshold size.

19. (Currently amended) The apparatus of claim ~~1~~ 18, comprising an interface for receiving the information from a host connected to the interface.

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20. (Currently amended) The apparatus of claim ~~1~~18, wherein the threshold size is determined in correlation with at least one logical consecutive sequence of the data mapped in the spare area.

21. (Currently amended) The apparatus of claim ~~1~~18, wherein the threshold size is essentially equal to the size of the largest contiguous free region in the user area.

22. (Currently amended) The apparatus of claim ~~1~~18, wherein the information is provided by a controller comprised by the apparatus.

23. (Currently amended) The apparatus of claim ~~1~~18, wherein a plurality of spare area arrays is provided and each of the arrays respectively is assigned to essentially each of a plurality of format features, in particular a track and in particular serves as a contiguous free region in the user area.

24. (Currently amended) The apparatus of claim ~~1~~18, wherein the data are re-allocated by slipping.

25. (Currently amended) The apparatus of claim ~~1~~18, wherein the re-allocation and re-mapping of data from the spare area to the

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user area in the further step is repeated until all data of at least one logical consecutive sequence is re-allocated in the contiguous free region in the user area.

26. (Currently amended) The apparatus of claim ~~1-18~~, wherein the information is written using an error correction code being based on physical block addresses, in particular instead of logical block addresses.

27. (Currently amended) The apparatus of claim ~~1-18~~, wherein defect data are mapped or re-mapped to a preferred predetermined address area.

28. (Currently amended) The apparatus of claim ~~1-18~~, wherein a protocol between the storage apparatus and a host records information on the re-allocation of data, in particular on re-map-, -map- and slip-data.

29. (Currently amended) The apparatus of claim ~~1-18~~, wherein the re-mapping is done on-the-fly, in particular by being essentially controlled solely by a storage apparatus controller.

30. (Currently amended) The apparatus of claim ~~1-18~~, wherein the re-mapping is implemented in a de-fragmentation process, in

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particular by being at least partially controlled by a host during an occasional de-fragmentation process.

31. (New) A method for handling data on a data storage apparatus comprising a data storage medium, in particular for handling data on a disc drive comprising a data storage disc, the medium having a user area and a spare area defined thereon, the method comprising the acts of:

allocating into the spare area the data assigned to the defect are upon detection of a defect on the medium

providing information about the size of a contiguous free region in the user area, and

reallocating a portion of the data allocated in the spare area into the contiguous free region in the user area if the size of the contiguous free region exceeds or is equal to a determined threshold size.

32. (New) The method of claim 31, comprising the act of providing the information by a host connected to the apparatus by an interface.

33. (New) The method of claim 31, comprising the act of determining the threshold size in correlation with at least one

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logical consecutive sequence of the data mapped in the spare area.

34. (New) The method of claim 31, comprising the act of setting the threshold size to be essentially equal to the size of the largest contiguous free region in the user area.

35. (New) The method of claim 31, comprising the act of providing the information by a controller comprised by the apparatus.

36. (New) The method of claim 31, comprising the act of providing a plurality of spare area arrays and each of the arrays respectively is assigned to essentially each of a plurality of format features, in particular a track and in particular serves as a contiguous free region in the user area.

37. (New) The method of claim 31, wherein the data are re-allocated by slipping.

38. (New) The method of claim 31, comprising the act of repeating the re-allocation and re-mapping of data from the spare area to the user area until all data of at least one

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logical consecutive sequence is re-allocated in the contiguous free region in the user area.

39. (New) The method of claim 31, using an error correction code being based on physical block addresses (PBA), in particular instead of logical block addresses (LBA).

40. (New) The method of claim 31, comprising the act of mapping or re-mapping defect data to a preferred predetermined address area.

41. (New) The method of claim 31, comprising the act of recording information on the re-allocation of data, in particular on re-map-, -map- and slip-data, according to a protocol between the storage apparatus and a host.

42. (New) The method of Claim 31, comprising the act of adapting the method to be solely controlled essentially by a storage apparatus controller.

43. (New) The method of claim 1, comprising the act of adapting the method to be implemented in a de-fragmentation process by being at least partially controlled by a host.